

a transmission mechanism for transmitting rotating force of said stepping motor to said feed screw, and

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spring means disposed between said nut member and said transfer table to elastically connect said transfer table to elastically connect said transfer table and said nut member when said transfer table transfers said workpiece to thereby allow said nut member to overrun, to allow said stepping motor to excessively rotate in a cushioned manner, and to apply a necessary thrust to said transfer table after said transfer table reaches a transfer end of said workpiece; wherein the spring means couples the transfer table and the nut member in order to displace the transfer table and the nut member relatively in an axial direction of the feed screw.

REMARKS

Favorable reconsideration of this application is presently amended and in light of the following discussion is respectfully requested.

Claims 1-11 are presently active in this case. Claim 1 has been amended by way of the present amendment.

In the outstanding Office Action, Claims 1 and 5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,517,852 to Kawakami et al; and Claim 11 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Kawakami et al in view of U.S. Patent No. 4,653,308 to Nagashima et al. Claims 2-4 and 6-10 were objected to as dependent upon a rejected base claim, but were indicated as being allowable if rewritten in independent form.

First, Applicants acknowledge with appreciation the indication that Claims 2-4 and 6-10 would be allowable if rewritten in independent form. However, since Applicants believe

themselves entitled to the scope of protection stated in Claim 1 (as amended), Claims 2-4 and 6-10 have presently been maintained in the dependent form.

The official action asserts on page 2 that "Kawakami et al. at column 3, a known arrangement wherein a spring connects the driven nut on a motor driven feed screw is described. While the specific 'stepping motor' is not explicit, one possessing ordinary skill in the art would be expected to utilize such drive motor means as an obvious choice of design to achieve the well-known benefits that accrue thereto such as enhanced rotative feed screw control and more precise translation of the table."

Applicants point out, however, that Kawakami et al. state at column 3, lines 1-13, that "the nut is not directly secured to the carriage but supported on the carriage through a plate spring having a flat surface parallel to the direction of the axis of the feed screw" and that "the feed screw does not become extremely defective even if a deviation is created between the axis of the nut moved by rotation of the feed screw and the axis of the feed screw because the nut can be minutely displaced in a direction orthogonal to the axis of the feed screw by the plate spring."¹ Hence, Applicant's submit that the plate spring couples the carriage and the nut together in order to displace them relatively in a direction orthogonal to the axis of the feed screw. Therefore, the plate spring does not couple them together in an axial direction of the feed screw in order to displace them elastically and relatively. In contradistinction thereto, the spring means defined by claim 1 couples the transfer table and the nut member in order to displace the transfer table and the nut member relatively in an axial direction of the feed screw.

Hence, Kawakami et al are not believed to anticipate or render obvious the subject matter of the present invention.

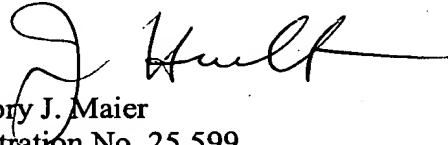
¹ Underlining added for emphasis.

In light of the above discussion, it is respectfully submitted that Claim 1 is patentably distinguishable from the applied patents, and the dependent Claims 2-11 are therefore also patentably distinguishable from the applied patents.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal allowance. An early and favorable action is therefore respectfully requested.

Respectfully submitted,

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IN THE CLAIMS

Please amend the claims as follows:

--1. (Amended) An electric actuator comprising a feed screw in a shape of a straight rod rotatably supported by a bearing member on a base,

a nut member screwed to said feed screw to reciprocate in an axial direction of said feed screw by normal and reverse rotation of said feed screw,

a transfer table connected to said nut member with a degree of freedom in said axial direction of said feed screw to transfer a workpiece by moving to follow said nut member,

a stepping motor a rotation amount of which can be controlled according to the number of drive pulses,

a transmission mechanism for transmitting rotating force of said stepping motor to said feed screw, and

12 1' spring means disposed between said nut member and said transfer table to elastically connect said transfer table to elastically connect said transfer table and said nut member when said transfer table transfers said workpiece to thereby allow said nut member to overrun, to allow said stepping motor to excessively rotate in a cushioned manner, and to apply a necessary thrust to said transfer table after said transfer table reaches a transfer end of said workpiece; wherein the spring means couples the transfer table and the nut member in order to displace the transfer table and the nut member relatively in an axial direction of the feed screw.--